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THE TREATMENT OF POST-PARTUM HEMORRHAGE.

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HAVING been requested by the directors of this Society to discuss in a paper the treatment of post-partum hemorrhage, it would be inappropriate to attempt a consideration of the general subject, hemorrhage after labor. In fact, the proper limit of a paper to be read before the Society, and to be discussed by it, does not admit of such a consideration *in extenso*. Yet, in order rationally to weigh the various methods of management of this sometimes fatal and always important accident, it will be necessary briefly to recall some of the salient conclusions bearing directly on the indications in treatment.

The term as used in the title of this paper has been generally understood to indicate an unusual loss of blood, during or subsequent to the after-birth period, from those uterine vessels which have orifices in the placental site. I, however, deem it best to make the term embrace any unusual bleeding from the genitalia occurring soon after the delivery of the fetus.

With such an understanding as to the signification of the term post-partum hemorrhage, we recognize all such bleeding, with rare exceptions, to be either from the placental site or from a laceration of some

portion of the genital canal. Hemorrhage coming from the placental site is associated with either a partial or a complete detachment of the placenta. The after-birth may be in the uterus, or it may have been expelled, or a portion may be remaining and adherent and the rest have been extracted. During such hemorrhage the uterus is in an imperfect state both of contraction and of retraction. This condition of the womb may be dependent upon an atony of its muscular fibres that is independent of influence exerted upon the uterus by its contents; an atony that prevents its sufficient contraction and retraction even if entirely empty; an atony dependent upon a variety of causes which the scope of this paper does not permit me to investigate. It is essential, however, to bear in mind that such an atony does at times exist.

Again, the presence of any substance in the uterus after the birth of the child may act mechanically, and in some other not well-understood manner, in preventing condensation of the womb sufficient to close the calibres of those vessels which are torn off in a partial or a complete separation of the placenta. In this way blood-clots, especially if somewhat firm, intra-uterine

tumors, the placenta or any portion of it or of membranes, may bring about bleeding. In the case of tumor, and especially of a partially-attached placenta, not only is an influence exerted similar in nature to that exerted by other intra-uterine substances, but these structures further act as splints over the surfaces of their attachment to prevent contraction of muscular fibres in that special portion of the womb, and a localized inaction or paralysis is produced. Moreover, while attached they determine a flow of blood into the vessels of that special uterine area.

But an atony not dependent upon the existence of some substance in the uterus is itself productive of retention of placenta, clots, membrane, etc. It is also apt to be associated with adhesion of the placenta; for the cause of this adhesion may have been operative also as a cause of uterine inertia. The presence of a tumor is also liable to have engendered atrophy of some portion of the uterine walls. Thus, then, do we often find an atony that in its origin antedates labor associated after the delivery of the foetus with some intra-uterine condition itself hemorrhage-producing.

I desire to emphasize the fact that hemorrhage from the placental site has as its one invariable cause insufficient uterine contraction with insufficient retraction. The insufficient contraction and insufficient retraction are dependent upon uterine inertia, whether this inertia is independent of or dependent upon some intra-uterine condition, and whether the uterus is empty or contains such substances as placenta, membranes, clots, tumors, etc. Hemorrhage from the placental site is due to insufficient shortening of uterine muscular fibres, to insufficient uterine condensation, to insufficient compression through this condensation of the uterine vessels leading to the placental site. Hemorrhage from the placental site means an insufficiently contracted and insufficiently retracted uterus.

Bring about sufficient uterine condensation, and we secure that physiological compression of the bleeding vessels by which nature when undisturbed limits the loss of blood to physiological requirements. Place, then, the uterus in a condition favorable to condensation, and secure promptly this condensation. Empty the uterus of its contents, and make it contract and retract. Such are the two indications, and under all ordinary circumstances these two

measures must be instituted quite simultaneously. To empty the uterus without assuring its condensation might prove fatal; to attempt to obtain condensation, and at the same time to leave within the uterus portions of after-birth, membranes, clots, etc., would prove futile, and possibly fatal.

The immediate removal of an intra-uterine tumor, productive of post-partum hemorrhage, must depend upon the extent to which the tumor is attached to the uterine wall. If not too intimately connected, its immediate removal with wire écraseur, or with scissors, after ligation of its pedicle, is indicated. If it cannot be promptly and with comparative safety removed, condensation of the uterine walls about it must be attempted.

The influence of thrombi in controlling bleeding from the placental area is too unreliable to merit our confidence. In lowered conditions of the system, as in exhaustion from hemorrhage, or in shock, they may act temporarily in checking the bleeding; but when the force of the circulation is somewhat regained, the thrombi are apt to be washed out and bleeding to recur, unless a firm retracted state of the womb has been in the mean time secured. Moreover, such thrombi are fruitful sources of septic infection; for they are very prone to undergo septic decomposition. In the relaxed state of the womb which accompanies their existence, atmospheric air is accessible to them, and they are also in contact with lochia, likely itself to become septic in character. Thrombi thus circumstanced are in one sense only slightly and most uncertainly conservative, and in another sense most certainly and greatly dangerous. The very existence of thrombi in the exposed vessels at the placental area seems to me pathological, and assiduously to be avoided. It is only as a *dernier resort* that we should ever employ those remedial measures which control hemorrhage by producing coagula in the vessels of the placental area. In order to prevent hemorrhage from these vessels, nature, when acting with normal efficiency, does not plug them with fibrinous masses, but she obliterates their calibre by the compressing action of uterine retraction. She does not keep the walls of these vessels apart by blood-clots, fragments of which may escape into the circulation and become emboli, probably septic emboli, in more or less remote parts of the economy, or

which, after conversion into sepsin, and being beyond the reach of detergent and antiseptic syringing, are certain to infect dangerously the entire system. *It is through uterine condensation, then, and not through the production of thrombi, that we must control hemorrhage from the placental area.*

Hemorrhage from a laceration of the cervix, vagina, perineum, or vulva is, of course, not dependent upon uterine inertia. The state of the uterus bears no relation to the occurrence or continuance of bleeding from a tear of the vagina or of the external genitals. Hemorrhage from a tear of the cervix is comparatively greater if the uterine body is relaxed, but it will at times continue excessive during decided uterine condensation. The uterine globe may be felt as of cannon-ball hardness, and yet active bleeding continue from the cervix. Retraction of the uterine body may diminish a hemorrhage from the cervix, but it is not efficient in actually stopping, and not always in materially lessening, the bleeding. Loss of blood from the uterine body will be effectually controlled by retraction of the uterus, but a tear of the neck or of any portion of the genital canal other than the uterine body will bleed, subject to the same influences as those which determine the extent of hemorrhage from a tear in other portions of the system. Such bleeding is, however, apt to be excessive. The entire genital apparatus and contiguous structures are greatly increased in vascularity during pregnancy, the blood-vessels become larger,—may become varicose or aneurismal,—and some of them, as those of the cervix, are devoid of valves, while other vessels are markedly erectile in character, as is most especially the case with those in the bulbs of the vestibule.

Usually bleeding from a laceration is less profuse, less immediately threatening to life, than if it proceeds from patulous utero-placental vessels; but it may nevertheless be very active, especially in varix or in aneurism of the vessels of the lacerated portion, or if the bulbs are torn. Although such hemorrhage usually is less profuse, it may continue for hours, or, by repeated detachment of thrombi, recur at short intervals for days. The aggregate of blood thus lost becomes very great. The magnitude of the detriment to result to the patient must not be estimated entirely by the immediate magnitude of the flow. Any considerable loss of blood from a

laceration may lead to secondary hemorrhage from the placental area by inducing relaxation of the uterine fibres, and, further, it may endanger life by gradual exhaustion, or, through lowering the vital powers, encourage the formation of sloughs, and also render the system incapable of resisting the inroads of septic poison. Again, should such a patient escape death from cerebral anæmia, septicæmia, and inflammation, the future still holds in store for her all the ills incident to subinvolution of the genital organs and surrounding tissues. Hemorrhage from a laceration, then, should not be overlooked, nor should its treatment be neglected.

Hemorrhage from the placental area and that from a laceration may coexist. A too rapid labor or a too greatly protracted labor is liable to cause uterine inertia, and also to produce a laceration of the soft parts. If bleeding is progressing, and the uterine body is relaxed and flabby, it is quite certain that the bleeding is largely, at least, from the severed utero-placental vessels; but blood may at the same time be escaping from a laceration of the cervix. During such an active hemorrhage there is no time to spare for the elimination of a coexisting loss from such a laceration. There is not time for making even a casual examination for such a purpose; and to determine the condition of the cervical and vaginal tissues after labor, a careful and necessarily somewhat protracted examination is required. The deduction is apparent,—viz., that in endeavoring to check a bleeding from the placental area our remedial measures should not be of a kind calculated to increase a bleeding from a laceration, but that greatly to be preferred are those measures capable of controlling either or both forms of hemorrhage.

I have already stated that excessive bleeding may continue from a laceration after the uterine body has been brought into a state of complete retraction, and hence it is clear that our remedial measures should not be limited to that class capable only of securing uterine condensation; for such measures cannot control a bleeding from a possibly, or probably, coexisting laceration.

After loss of blood the system by reason of increased activity of the absorbents receives septic poison rapidly into itself, and by reason of its enfeebled condition passes

quickly, and to a dangerous extent, under the influence of this poison. Our remedial measures, then, should not be of a character to increase to the slightest extent the liability to septic infection.

As is well recognized, traumatic conditions, such as contusions and lacerations, are, in puerperal women suffering from great loss of blood, exceedingly prone to inflammation of an erysipelatous or other adynamic type: hence our remedial measures should not be of such an irritant nature as to increase in the slightest degree the tendency to inflammatory action. Our remedies for post-partum hemorrhage must be of such promptness as to ward off danger immediately threatening, they should be certain in their action, and, if possible, fraught with no harm, immediate or remote, to the patient. A maximum of promptness and certainty combined with a minimum of noxiousness to the patient must be aimed at in the choice of treatment for post-partum bleeding.

In the light of the various considerations which I have endeavored to present, let us now proceed to analyze, and to endorse or to reject, the more prominent of the numerous agents and measures at present in vogue.

To attempt a consideration of the prevention of post-partum hemorrhage would carry me over the entire management of labor; for its causes may antedate delivery for hours, or may antedate labor itself. However, immediately after the escape of the fœtus the hand should be placed on the abdominal wall over the uterus, and by moderate pressure its retraction be insured about the still-remaining but probably partially-detached placenta. If there is as yet no unusual bleeding, the after-birth should be allowed to remain for ten to fifteen minutes; but if there should be too profuse a loss of blood, and the absence of sufficient retraction should suggest the loss to come from the placental area, the uterus should be made further to retract by compression of it with the hand over the abdomen, and if the hemorrhage does not promptly stop, the placenta should be immediately expressed by Crêdè's method, and the uterus should be brought into a further state of retraction by the hand externally compressing it. If there is reason to believe that the bleeding is almost entirely from a torn cervix,—and this conclusion may be arrived at by eliminating,

through inspection, a perineal, vulvar, or lower vaginal tear, and by observing a womb retracted about the placenta,—it is still best practice to express the placenta if the bleeding is considerable; otherwise, in the effort to control such bleeding the hand and the attention of the physician will be taken from the uterine body, and its relaxation may take place, with an establishment of a bleeding from the placental area. The same rule in reference to the expression of the placenta holds good if there is *very excessive* loss of blood from a tear of the perineum, or of some part of the vulva, as of the bulb; but if the bleeding from such tears is not excessive, only moderate, the placenta should be allowed to continue *in utero* the usual ten or fifteen minutes, the uterus being carefully watched while measures are instituted for the control of the loss from the laceration.

The rule to remove promptly the placenta in excessive bleeding from a lacerated cervix, the uterus being retracted, is not an absolute one, provided the physician is favored by having a quick and reliable nurse, and the means are at hand for controlling such hemorrhage,—viz., hot water and the necessary requisites for its injection against the cervix. This measure will not only check the bleeding from the torn neck, but it will also stimulate the uterus into safe retraction.

Ergot is often administered as the child is being born, with the view of preventing hemorrhage, more particularly after the escape of the placenta. The objection to the administration of ergot at this time is that it may place the womb in a state of tetanic contraction before the escape of the placenta, and this structure may thus be incarcerated so firmly that etherization and dilatation with the hand will be needed for its removal. Such an effort does at times follow the resort to ergot at the ending of the second stage, but only as a rare occurrence. The action of ergot is usually noticeable only after a number of minutes have elapsed, so that after the onset of hemorrhage it cannot be relied on to the exclusion of other more prompt and, I will add, more certain agents. During hemorrhage it should always be given hypodermically. When thus administered its action is decidedly more prompt and more certain than when given by the mouth. Yet, in shock and after consider-

able exhaustion from loss of blood, ergot, when used hypodermically, is an unreliable agent, and if given by the mouth it may produce vomiting, when not only is its oxytocic effect lost, but the prostration from vomiting is superadded to that due to shock or other cause. This drug is of greater value in preventing relaxation of the uterus after it has once been well retracted, and it is of special value in diminishing that gradual leakage from the placental area which at times constitutes a too great lochial flow. It is of little value in checking a hemorrhage actively progressing, because of the slowness and uncertainty of its action. Yet it should always be administered in hemorrhage, because of its value in maintaining retraction of the womb after that condition has been secured by means of other more prompt agents. I know of no remedy which, acting after its entrance into the circulation, is equal in its oxytocic effects to ergot.

There are serious objections to the introduction, during hemorrhage, of the hand into the uterus or into the vagina to remove a retained or loosely-attached placenta. In hemorrhage the existence of a tear of the upper vagina or of the cervix cannot be excluded. Such a tear may exist, and the passage of the hand into the genital canal, or more especially its withdrawal when grasping the after-birth, will most probably increase the extent of the laceration and add to the contusion of tissues. Hemorrhage from the tear will be increased, the liability to subsequent sloughing or to inflammation be enhanced, and shock induced, or, if present, aggravated, not to dwell on the additional danger of transferring manually septic poison. The latter accident ought never to occur, with the light thrown, by our somewhat recently attained knowledge, on its occurrence and its prevention. The bulk of the hand may even originate a laceration in tissues that have been greatly weakened by being compressed and overstretched by the emerging child. If the placenta is so adherent that external manual expression cannot secure its removal, and hemorrhage continues, it will be necessary to introduce the hand promptly but cautiously into the uterus, and to secure properly the detachment and extraction of the after-birth. But it is always unfortunate when such a manoeuvre is necessitated.

If the physician does not reach the pa-

tient until she is in a state approaching syncope from excessive loss of blood, and the placenta has not been delivered, and the hemorrhage is in abeyance, it will still be best to express the placenta with the hand externally applied, being at the same time exceedingly careful to secure full uterine retraction during and after its expulsion. If the after-birth is still longer allowed to remain, the bleeding may occur at any moment, and a fatal result follow.

If, however, in such a case of extreme exhaustion from loss of blood, the placenta is too adherent to be thus expressed, the bleeding having entirely ceased, it becomes a serious question as to the propriety of immediately introducing the hand for its detachment and extraction. The shock thus aggravated may prove fatal in the then low condition of the woman. Under such circumstances it will probably be best while securing retraction, if possible, about the placenta, at the same time and without delay to direct proper measures towards the relief of cerebral anæmia.

If further hemorrhage does not supervene, it would be best, while treating the extreme exhaustion, to wait a short time for some reaction before extraction of the placenta with the introduced hand. If further hemorrhage should appear before reaction is apparent, the critical nature of the case is greatly intensified, and the immediate introduction of the hand into the uterus becomes an unavoidable necessity, with increased probability of a fatal result. The increased danger would be largely due to shock incident to dissecting off a firmly adherent placenta.

I doubt if the circumstances would ever be such as to warrant permitting the placenta to remain in the uterus for hours or for days, as has been occasionally advocated. In case of hemorrhage after the complete removal of after-birth and of membranes, any clots that have formed in the uterus may be easily removed by external compression without the introduction of the hand.

Now, as to the means for securing condensation after the uterus has been emptied. External compression will usually secure this, but not always. There is excellent authority for introducing the hand into the uterus and, by there moving it about, to excite contraction and retraction. I must, however, deprecate such practice as unnecessary and harmful. There is great

probability of lacerating tissues or of increasing existing lacerations, of irritation and of contusion, of producing or aggravating shock. The procedure is a dangerous one, and, moreover, will not always produce uterine condensation, and may increase bleeding from lacerations. A patient thus treated, if escaping present dangers, will, by reason of this special treatment, be in increased danger from inflammation, sloughing, secondary hemorrhage, and septic infection. The hand should never be introduced into the uterus solely with a view of provoking uterine condensation. Under some circumstances the hand may be introduced for diagnosis, as when there is reason to believe that a portion of membranes or placenta has been left, or that an intra-uterine tumor is present. Very rarely indeed, however, will it be necessary or justifiable to introduce the hand, except to remove such contents as are so adherent or incarcerated that they cannot be removed in any other manner. It has been advised to carry a peeled lemon or a cloth saturated with vinegar into the uterus with the hand, and then to squeeze it so that the fluid may stimulate condensation. To this procedure there are the same objections as those existing against the introduction of the simple hand. The juice of the lemon or the vinegar thus applied will superinduce contraction, and the hand will not remain long in the uterus, yet the very introduction and withdrawal of the hand are objectionable. The lemon-juice or the vinegar acts largely by reason of its astringent and irritant effects; but it is scarcely sufficiently an irritant to produce special harm. The injection of diluted vinegar into the uterus is effective, doubtless, in securing contraction; the agent does not specially irritate, it does not produce hard clots, though productive of soft coagula, and it has the advantage of being disinfectant. Yet it is something of an irritant, is often not quickly accessible in sufficient quantity, and cannot well be employed to wash out the genital canal. It is a remedy against which strong objection cannot be urged, but I do not deem it the most feasible or the most desirable one. A per-salt of iron in different solutions in water has been largely used and strongly advocated on the continent of Europe and in Great Britain. Its advocates are among those highest in authority as teachers, writers, and practical obstre-

tricians. It is injected into the uterine cavity in Continental Europe in a deep wine-colored solution, and in Great Britain in the proportion of one ounce of Monsel's solution, or one ounce of liquor ferri chloridi, to three ounces of water.

This remedy cannot be so decidedly harmful as its opponents have claimed. Had it so proved, it would not have continued until now in the confidence of so many able and experienced physicians. There are to my mind, however, objections to the iron salt which do not obtain against some other agents. It acts chiefly by producing coagula in the patulous vessels, and I have already insisted that such thrombi should be assiduously avoided; it also produces hard clots, which remain in the uterine cavity as irritant masses, provocative of inflammation; it has a minimum of influence in securing uterine condensation; after its employment, and after the hemorrhage has been checked, the womb will be found large and soft, evincing imperfect retraction. In other words, the calibres of the uterine vessels are not obliterated through condensation. They must contain coagula liable to all the changes in character and in location that such thrombi under such circumstances are usually liable to. There must be danger of septicæmia or pyæmia resulting, of undue inflammatory action, or, at best, of tardy convalescence. If used at all, I should prefer the stronger solution, as most likely to excite that special desideratum, decided uterine retraction. Swabbing the interior of the uterus with a cloth or a sponge saturated with the undiluted solution of the Pharmacopœia necessitates the introduction of the hand into the vagina, and partially or completely into the uterus, in addition to the other objections to the employment of a per-salt of iron. I feel that a resort to this use of iron will be rarely necessitated, and that the agent should be reserved for such very rare cases as do not respond to other treatment.

The tincture of iodine has been recommended as a substitute for the iron salt. It certainly does not produce hard coagula, as does the iron, and must doubtless stimulate uterine retraction. But it is not reliable, except in a somewhat concentrated state, when it is too irritating.

Ice introduced against the cervix, or, most effectively, into the uterus, becomes a decided, and generally a reliable, stimu-

lant to condensation. But the hand must be usually carried into the vagina in order to introduce ice into the uterus. The injection of cold water into the uterine cavity is free from this objection, and is generally reliable. The application of ice to the abdomen, while at the same time compressing the uterus with the hand externally, is also usually of great service. The cold douche over the abdomen from a height is certainly a very powerful reflex stimulant to the uterine fibres, but it floods the patient and the bed. The objection to cold in any form is that it is liable unduly to chill the patient, and possibly to contribute to exhaustion, inflammation, etc. An objection even more vital is that in great prostration cold in any form loses its power to excite uterine contraction, and the hemorrhage continues. In one instance I nearly lost my patient by trusting too long to its influence. I was forced in that case to resort to Monsel's solution in order to prevent a fatal result.

I come now to a remedy not so long in vogue, but one that has in my hands given most satisfaction. I refer to hot water. Water at a temperature of 112° or 115° F. freely injected into the uterus becomes a prompt excitant of retraction.

It will produce this effect with greater promptness than will cold water or ice, and will bring about uterine condensation after ice has failed because of the patient's great exhaustion. It should also be applied externally over the abdomen. I am in the habit of folding a towel as a flat compress, saturating it with water as hot as my hands will possibly endure, squeezing out the redundant water, applying the wet and hot towel on the abdomen, and then, placing my hand on the towel through it, compressing the uterus. The womb will be felt to harden promptly even when the same manœuvre with iced water has previously not succeeded in obtaining condensation. The remedy may be rendered disinfectant with permanganate of potash, carbolic acid, etc., or even more efficient in producing retraction by the addition of vinegar, though I have never seen this addition necessitated. Hot water controls bleeding from the placental site by securing with certainty prompt and complete condensation. It has no, or at least very little, influence in the formation of thrombi; it washes out all clots and leaves the uterus clean; it will secure condensation after

other agents have, by reason of the patient's exhaustion, failed; it is operative when the patient is under ordinary etherization; it controls bleeding from lacerations at the same time that it controls the loss of blood from the placental area; it controls bleeding from the laceration by producing contraction of the vessels, and not by causing coagulation of the blood; it is more invariably attainable than other agents, and can be had in all seasons and in all climates.

The water should be hot enough,—as hot as the hand, or, better, the uncovered arm, can endure. This degree of heat is not usually painful to the patient, excepting to a limited extent at the external genitals. There is no shock resulting from its use: it is a remedy against shock. It is followed by an increased feeling of comfort. It will regulate irregular uterine contraction by stimulating the entire body into contraction, and will thus check bleeding when superinduced by paralysis of the placental area. It is valuable in the prevention of hemorrhage in "bleeders," or in any case in which there is reason to expect undue loss of blood.

Of all remedies directed towards the stopping of post-partum hemorrhage, hot water thus combines the maximum of promptness and certainty with the minimum of noxiousness to the patient.

To summarize very briefly the line of management, I would say, as soon as the child is born, secure, with the hand over the abdomen, retraction about the placenta; if hemorrhage occurs, express the placenta and continue with the hand externally to effect retraction. If the bleeding does not promptly stop, inject hot water in considerable quantities into the cavity of the uterus. While the injection is being effected, apply or have applied at the same time a hot wet compress over the abdomen, and, by a hand placed on this compress, make firm pressure on the uterus. Ergot should be as soon as possible injected hypodermically, but the above measures should take precedence in time of application.

In post-partum hemorrhage dependent upon a laceration of a cancerous cervix, I have had of late no opportunity to use the hot water. In such a laceration it should be employed; but if the bleeding is not quickly controlled, a piece of cloth saturated with Monsel's solution should be

pressed with the fingers against the bleeding surfaces. In post-partum bleeding following placenta prævia I have not used hot water, but should expect its favorable action. In one such case, swabbing the placental area around the internal os with Monsel's solution acted so promptly in preventing death that I should prefer at once to resort to this remedy in such cases. I should never make an application of Monsel's solution by way of merely preventing hemorrhage even in cancer of the neck, nor in placenta prævia; for bleeding after labor is not an invariable accompaniment of either of these conditions.

There are not a few minor adjuvants in the treatment of post-partum hemor-

rhage, such as compression of the aorta, lowering the head, admitting fresh air, etc., which are more or less valuable, but which do not demand discussion in this paper.

In cerebral anæmia following an excessive loss of blood, the hypodermic injection of stimulants—whiskey, ether, etc.—is of very special value, as in syncope absorption from the stomach is very slow or in total abeyance.

Small doses of an opiate aid in filling the cerebral vessels, diminish shock, and quiet restlessness.

Of other remedies indicated or recommended I must refrain from speaking, because of the already probably too great length of this paper.